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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

DOUGLAS FIR BEETLE INFESTATION

Cody Canyon, Shoshone National Forest, Wyoming

by
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The 1937 survey of the Douglas fir beetle control project of the Cody Canyon, Shoshone National Forest was instituted on August 1. Mr. A. L. Gibson, Assistant Entomologist, Forest Insect Laboratory, Coeur d'Alene, Idaho, who was in charge of this operation, was assisted by Mr. Herzman, Ecw Foreman, and a crew of four strip runners. Due to unavoidable circumstances, the completion of this survey was delayed from the 1st of September until the 11th.

This year's project provided for the coverage of not only the areas accessible to the highway and which have been covered by control during the past few years, but the so-called inaccessible back areas which have acted as a source of reinfestation to the treated units. These two phases of this year's project called for somewhat different data. As existing plans called for the use of CCC enrollees in treating the infested trees within the accessible areas, the question of an allotment of funds was not involved. As a result, only sufficient data were secured from these units to determine the necessity for the institution of control. Though it is realized that with such data the estimated number of infested trees within these units will vary from the actual number which will subsequently be treated, the data are sufficiently accurate for the purpose intended. The inaccessible back areas presented a more difficult problem. The impractibility of

attempting to work these areas from the CCC camps made it apparent that in the event of control measures' being instituted, an appropriation of funds would be necessary for the hiring of laborers and overhead for the establishment of temporary camps. Under these conditions it was necessary to make a more intensive survey of these units in order to secure an accurate estimate of the number of infested trees which serves as a guide for the cost of the operation.

As the data secured from this survey has been forwarded to this laboratory in a series of memoranda and telegrams, some errors may have occurred, which may require some slight changes in the recommendations. However, this will be of minor importance and will be confined to the accessible areas to be worked by CCC enrollees.

ANALYSIS OF THE 1937 DATA

The Cody Canyon bark beetle project is peculiar in that we have been concerned with a primary insect which is attacking in a secondary capacity. The Douglas fir beetle infestation is but an aftermath of the spruce budworm epidemic that has been present within the area since 1922. The severe defoliation associated with the budworm outbreak, which soon spread to a tremendous acreage, made available a continuous supply of dying trees which were especially attractive hosts for beetle attack. Fortunately the heavy centers of defoliation were confined to the heads of the many draws and side drainages of the Shoshone River, so that the trees along the river and around the many resorts, though

attacked, were not severely weakened. Within the centers of severe defoliation with an annually increasing supply of dying trees, the existing population of the Douglas fir beetle rapidly increased to a point where primary attacks occurred.

In 1931 it was apparent that the bark beetle population had increased to a point so it could no longer be absorbed by the supply of weakened and dying trees, and that unless this population was reduced by artificial control a severe loss of scenic timber would follow. To accomplish this objective bark beetle control measures were instituted in the fall of 1931 and have continued through subsequent years. During this period, with the exception of the 1935 and 1937 seasons, the trees around the resorts, summer homes, etc. were sprayed in an attempt to reduce the budworm defoliation to a minimum.

The entomological plan of bark-beetle control adopted at the institution of this project was of a necessity influenced by existing conditions. The infested areas were roughly separated into two classifications, accessible and inaccessible. The accessible areas were those centers of budworm defoliation which could be worked from the highways, though some of these could be reached only with an hour or more of walking time. The inaccessible areas were at the heads of the larger side drainages and were in a rough, steep, rocky region which could not be worked from the highways. With no funds available for the establishment of camp in these back areas, and in later years the impossibility of utilizing CCC enrollees for this purpose, control measures have been

confined to the more accessible territory. Such a plan of control could only have as its objective the reduction of the beetle pupulation within the treated areas to a point where it would be absorbed by the trees dying from budworm defoliation. This objective was directed toward the preservation of the trees along the river and around the resorts, and not the severely defoliated trees, as their death was inevitable. That this holding plan of control has been successful is shown by the complete absence of timber losses within the areas for which protection is especially desired. Though successful in accomplishing its objective, each year the treated areas have been, and will be, reinfested as long as untreated areas of infestation are nearby, and as long as the budworm epidemic continues to leave a supply of dying trees. It is difficult to evaluate or compare the success of this operation with any other plan of control. Though a more extensive operation would have unquestionably lessened the severity of the annual reinfestation within the so-called accessible units, as long as dying budworm trees remained within those areas, maintenance control would have been necessary.

During the past season the spruce budworm infestation around the utility areas was so light that spraying was considered unnecessary. Furthermore, with the exception of a few areas, it would seem that there has been a marked reduction in the budworm population throughout the entire drainage, and it is hoped that this favorable condition marks

at least the beginning of the end. Furthermore, there has been a marked reduction in the severity of the bark beetle attacks, as 21 percent of the infested trees encountered on the survey strips were recorded as light attacks. Furthermore, in many trees the attacks are confined to the lower portion of the bole, with many instances of infested lengths extending to a height of only four to six feet.

Under these conditions, and with the hope that the budworm epidemic may be approaching its end, it is recommended that an effort be made to extend the present plan of control so as to include the so-called back or inaccessible areas. In making this recommendation it is fully realized that as long as trees are present within the units which are dying from budworm defoliation the Douglas fir beetle will be present, and will remain a potential source of danger to the scenic timber stands at stake. By extending control into all infested areas it is hoped that the beetle population will be reduced sufficiently to remove the present threat to the scenic timber stands, and that this condition will prevail until the budworm outbreak is at an end and normal conditions are restored.

An attempt has been made in this analysis as well as in past reports to present the Cody Canyon problem as fairly and clearly as possible. The situation is peculiar in that the success of our past efforts rests very largely upon the future of the budworm epidemic.

The following tabulation lists the areas for which control is recommended.

AREAS FOR WHICH CONTROL IS RECOMMENDED WHICH ARE ACCESSIBLE TO CCC CAMPS

Unit	Acres	Number of infested trees: No. of 1936 attacks	Number of infested trees: Estimated No. of 1937 attacks	Remarks
Blackwater-Sheep Creek River Area	250	-	72	Though the 1937 infestation is still light, .180 tree per acre, control is recommended due to the increase which has occurred.
Sheep Creek	256	34 Treated	50	1937 infestation showed .196 tree per acre as against .133 in 1936.
Mesa-Fishhawk Creek Slope	600	-	60	Though the infestation on the entire unit is very light, most of it is concentrated in an area of approximately 30 acres. This concentrated area should be treated, but not the entire unit.
Fishhawk (Lower)	786	93 Treated	226	Budworm damage decreased, with a lighter bark beetle infestation on the treated area. 1937 bark beetle attacks were confined to the head of a large draw to the east of the creek.
Dead Horse Gulch	100	49 Treated	64	Though the 1937 infestation is somewhat lighter than that of 1936, it is still sufficiently heavy, with a large number of heavy attacks, to warrant control.

Unit	Acres	Number of infested trees: No. of 1936 attacks	Number of infested trees: Estimated No. of 1937 attacks	Remarks
Little Dead Horse Gulch	60	104 Treated	64	Same condition as described in Dead Horse Gulch.
Mormon Creek	360	165 Treated	278	Marked increase in the bark beetle infestation, with severe budworm damage in 1937.
Greever Creek	46	116 Treated	92	Status of the 1937 infestations warrants control.
Rieneckers	200	144 Treated	259	Increased 1937 infestation justifies treatment.
Overlook Gulches	288	247 Treated	345	Severity as well as the increased infestation warrants control.
Libby Flat	49	-	28	Increased infestation warrants control.
Elephant Head	216	-	144	Increased infestation justifies control.
Little Elephant Head	40	336 Treated	69	Character of the 1937 infestation as well as the severity warrants control.
Chimney Rock Creek	127	201 Treated	136	Heavy concentration of infested trees justifies control.

Unit	Acres	Number of infested trees: No. of 1936 attacks	Number of infested trees: Estimated No. of 1937 attacks	Remarks
Lost Draw	100	219 Treated	250	Severity of infestation warrants control.
West Lost Draw	102	502 Treated	265	Same situation as Lost Draw.
Cliff Creek	65	104 Treated	79	1937 infestation sufficiently heavy to warrant control.
Palisade Gulch	140	56 Treated	99	1937 infestation warrants control.
Cedar Gulch	95	274 Treated	37	Though due to the shorage of host material a reduced infestation is present in this area, it should be treated.
Sawmill Gulch	200	25 Treated	126	Increased Infestation warrants control.
Three Draw Slope	225	480 Estimated	268	Though the infestation has decreased in severity, it is still sufficiently heavy to justify control.
Spring Draw	200	508	512	Heavy infestation justifying control.
Grinnel Creek	250	97 Treated	113	Increased infestation justifies control. Timber scattered, and infestation heavier than indicated by the data.

Unit	Acres	Number of infested trees: No. of 1936 attacks	Number of infested trees: Estimated No. of 1937 attacks	Remarks
North Fork to East Entrance	300	-	57	Increased infestation.
Mormon Creek Grinnel Creek Slope	1,000	119 Treated	356	Increased infestation and character of attacks justifies control.
Pahaska-Jones Creek (East side)	1,500	231 Estimated	950	Marked increase in the 1937 infestation.
Castle Gulch	40	89 Treated	22	Though a reduced infestation, the treatment of these trees is justified.
Grinnel	250	367 Estimated	146	No data relative to status of infestation.
Libby Creek	450	676 Estimated	435	" " " "
Goff Creek	580	777 Estimated	636	" " " "

AREAS FOR WHICH CONTROL IS RECOMMENDED WHICH ARE NOT ACCESSIBLE TO THE CCC CAMP

Unit	Acres	Number of infested trees: Estimated No. of 1936 attacks	Number of infested trees: Estimated No. of 1937 attacks	Remarks
Crow Creek	350	63	74	If North Fork drainage is treated, the lower portion of the Crow Creek drainage should be included, though the infestation is rather light.
Crow Creek-Jones Creek Slope	600	-	134	Infestation rather light, but believe the area should be included in any plan of control for the North Fork area.
Jones Creek	750	-	100	Infestation concentrated in lower portion of this unit. Should be included as a part of any plan of control for the North Fork area.
Jones-Red Creek	1,100	993	600	Infestation sufficiently heavy to justify the institution of control as a part of the North Fork area.
Red-Torrent Creek	750	-	100	Though a rather light infestation, the 1937 attacks are concentrated around the groups of trees killed in 1936. These trees should be used as a guide to the location of 1937 attacks.

Unit	Acres	Number of infested trees: Estimated No. of 1936 attacks	Estimated No. of 1937 attacks	Remarks
Sweetwater	5,000	260	1,445	Infestation increasing. Area is rough and inaccessible; however, these trees should be treated as a part of any program of back area clean-up.
Elk Fork	1,650	-	1,686	The severity of the infestation within this area justifies the expense of control in a program of back area control. Severe budworm damage in this area.
Fishhawk-Upper Canyon Area	1,500	710	584	Heavy infestation in the canyon area warrants control.
Fishhawk Creek-Upper Glacier Basin	500		125	Light infestation concentrated in an accessible area. Should be treated as a protection to the Upper Canyon area.
Upper Newton Creek	1,200	?	932	Severe infestation which acts as source of reinfestation to accessible areas along river. Would require one camp on Upper Newton.

AREAS FOR WHICH CONTROL MEASURES ARE NOT RECOMMENDED

Unit	Acres	No. of 1936 infested trees	Estimated no. of 1937 infested trees	Remarks
Clearwater Creek	1,500	No estimate	50	Infestation too light to warrant control.
Upper Eagle Creek	5,000	100 Estimated	120	" " " " " "
Canfield Creek	1,500	No estimate	94	" " " " " "
Sheep Mesa River Area	100	-	-	
French Gulch	80	-	-	
Overlook Slope	80	22 Estimated	-	
Draw West of Greever Creek	50	-	-	
Kitty Creek (Upper)	1,500	-	-	
Blackwater	2,000	-	-	
Blackwater (Upper)	75	125 Estimated	18	
Moss Creek	272	-	-	
Lower Gulch	-	-	-	

Unit	Acres	No. of 1936 infested trees	Estimated no. of 1937 infested trees	Remarks
Newton Creek (Lower)	95	37 Treated	-	
Aspen Ridge	119	14 Estimated	-	
Bloom Gulch	215	-	-	
Chimney Rock Flat	50	-	-	
Mesa Creek	171	No data	6	
Big Creek	1,200	No data	109	Light infestation and remote from areas for which protection is desired.
Gunbarrel	425	69 Estimated	6	
Kitty Creek	600	162 Estimated	-	
Canyon Creek	60			
Lost Creek	50			
Clock Tower	No data			
Horse Creek	No data			
Grizzly Creek	No data			
Spring Creek	No data			

SUMMARY OF AREAS FOR WHICH CONTROL IS RECOMMENDED

Areas Accessible to Highway to be Worked by CCC Enrollees

	1936	1937
Number of areas	32	30
Number of acres	9,656	8,875
Number of infested trees	8,232	6,238

Areas Not Accessible to Highway for Which Funds Will be Required

Number of areas	10
Number of acres*	13,410
Number of infested trees	5,780

* Some eliminations can be made from this acreage.

Estimate of Funds Required for Treatment

The difficulty of determining the fund which will be required for the treatment of these trees should be appreciated, and considerable leeway accorded to the estimate given. In consideration of all the factors involved which have a direct relation to the expense of this operation, it is believed that the cost will not be less than $3.00 per tree, and it is recommended that the sum of $17,340 be alloted for this purpose. It will be appreciated that with no previous experience relative to the cost of control within these areas, the figure as given is little more than an estimate of the ultimate cost.

Respectfully submitted,

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Entomologist